What is claimed is

1 An optical measuring system for evaluating a substrate, the system comprising

a laser configured to generate an intensity stabilized light beam;

an optical system for directing the beam to a spot on a substrate being evaluated;

drive mechanism to rotate the substrate;

track and support structures to bring about relative motion of the light beam relative to the surface of the substrate as the substrate rotates;

a detection system configured to receive and detect light reflected from the substrate;

said detection system including polarizers to convert the reflected beam to s and p polarized light and detectors to read the information content of the s and p polarized reflected beams; and,

an elliptical cavity positioned adjacent to the point of impingement by the beam onto the substrate to capture the scattered light from the substrate and to detect the information incorporated into the detected scattered light to provide surface information of the substrate under evaluation.

2. An optical measuring system in accordance with claim 1 in which a focal point of said elliptical cavity is positioned substantially at the surface being examined.

3. An optical measuring system in accordance with claim 1 in which a detector is positioned substantially at a focal point of said elliptical cavity.

4. The optical measuring system of claim 1 in which the laser generates an intensity stabilized wavelength of approximately 532 nm.

5. The optical measuring system of claim 1 in which said detection system includes a beam splitter to split the reflected beam into two paths and to convert the second split beam into s and p polarized beams.

6. The optical measuring system of claim 1 in which said elliptical cavity has internal reflecting surfaces to effectively detect substantially all the scattered light of the optical measuring system entering the elliptical cavity.

7. The optical measuring system of claim 1 in which said elliptical cavity is positioned with a focal point substantially at the surface under examination and the other focal point of said cavity substantially at the detector.

8. The optical measuring system of claim 4 in which said elliptical cavity is positioned with a focal point substantially at the surface under examination and the other focal point at the detector for said cavity.

9. An optical measuring system for evaluating a substrate, the system comprising

a laser configured to generate an intensity stabilized light beam in a wavelength of above about 400 nm;

an optical system for directing the beam to a particular spot on a substrate being evaluated;

drive mechanism to rotate the substrate;

track and support structures to bring about relative motion of the light beam relative to the surface of the substrate as the substrate rotates;

a detection system configured to receive and detect light reflected from the substrate;

said detection system including polarizers to convert the reflected beam to s and p polarized light and detectors to read the information content of the s and p polarized reflected beams; and,

an elliptical cavity positioned adjacent to the point of impingement by the beam onto the substrate to capture the scattered light from the substrate and to detect the information incorporated into the detected scattered light to provide surface information of the substrate under evaluation.

10. An optical measuring system in accordance with claim 9 in which said intensity stabilized light is at 532 nm.

11.An elliptical cavity for the detection of surface scattered light in a surface reflectance analyzer, comprising a truncated elliptical cavity to be positioned with the surface under examination substantially at one focal point of the cavity and a detector at the other focal point of the cavity, and mirror like walls internally along the inner surfaces of the cavity.

12. An optical measuring system for evaluating a substrate, the system comprising
a laser configured to generate an intensity stabilized light beam in a wavelength of above about 400 nm;
an optical system for directing the beam to a particular spot on a substrate being evaluated;
drive mechanism to rotate the substrate;
track and support structures to bring about relative motion of the light beam relative to the surface of the substrate as the substrate rotates;
a detection system configured to receive and detect light reflected from the substrate;
said detection system including position sensitive photo-detectors to read information concerning the substrate from the substrate under evaluation.

13. An optical measuring system for evaluating a substrate, the system comprising
a laser configured to generate an intensity stabilized light beam in a wavelength of above about 400 nm;

an optical system for directing the beam to a particular spot on a substrate being evaluated;

drive mechanism to rotate the substrate;

track and support structures to bring about relative motion of the light beam relative to the surface of the substrate as the substrate rotates;

a detection system configured to receive and detect light reflected from the substrate;

said detection system including quadrant photo-diodes to read information concerning the substrate from the substrate under evaluation including the directionality of the scattered light.

15. An optical system in accordance with claim 9 in which the detection system includes one or more position sensitive photo-detectors.

16. An optical system in accordance with claim 1 in which one or more of the detectors comprises a position sensitive photo-detector.

17. The optical system of claim 15 in which said photo-detectors comprise quadrant photo-diodes.

18. An optical measuring system for evaluating a substrate, the system comprising

a laser configured to generate an intensity stabilized light beam;

an optical system for directing the beam to a spot on a substrate being evaluated;

drive mechanism to rotate the substrate

track and support structures to bring about relative motion of the light beam relative to the surface of the substrate as the substrate rotates;

a detection system configured to receive and detect light reflected from the substrate;

said detection system including polarizers to convert the reflected beam to s and p polarized light and detectors to read the information content of the s and p polarized reflected beams; and,

compensators in the optical path to compensate for unwanted phase shifts between the s and p beams introduced by other optical components.

19. The optical measuring system of claim 18 including

an elliptical cavity positioned adjacent to the point of impingement by the beam onto the substrate to capture the scattered light from the substrate and to detect the information incorporated into the detected scattered light to provide surface information of the substrate under evaluation.

20. An optical measuring system for evaluating a substrate, the system comprising

a laser configured to generate an intensity stabilized light beam;

an optical system for directing the beam to a spot on a substrate being evaluated;

drive mechanism to rotate the substrate

track and support structures to bring about relative motion of the light beam relative to the surface of the substrate as the substrate rotates;

a detection system configured to receive and detect light reflected from the substrate;

said detection system including polarizers to convert the reflected beam to s and p polarized light and detectors to read the information content of the s and p polarized reflected beams; and

a quarter wave plate at an angle of approximately 45 degrees with respect to the p-polarization axis on a tilting plate that permits tilting of the wave-plate with respect to the beam axis.

21. The optical measuring system of claim 20 including

an elliptical cavity positioned adjacent to the point of impingement by the beam onto the substrate to capture the scattered light from the substrate and to detect the information incorporated into the detected scattered light to provide surface information of the substrate under evaluation.